

## Two New Species of *Arcuphantes* (Araneae: Linyphiidae) from Korea

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### ABSTRACT

Two new species of *Arcuphantes* Chamberlin and Ivie, 1943 (Linyphiidae), *Arcuphantes juwangensis* n. sp. and *Arcuphantes namhaensis* n. sp., are described with illustrations. All Korean *Arcuphantes* have a convoluted epigynal scape, and show close similarities in their morphological characters, but easily discriminated in the structures of proximal protuberances and the distal wing-shape of their epigynum.

**Key words:** new species, *Arcuphantes*, Linyphiidae, Araneae, Korea

### INTRODUCTION

Spiders of the genus *Arcuphantes* Chamberlin and Ivie, 1943 have the long legs and an extended epigynal scape, and chelicerae with three large teeth in front and three to four small ones behind in the female, with two in front and none behind in the male. Anterior median eyes are smaller than the others. Abdomen is arched above, pointed posteriorly (Chamberlin and Ivie, 1943). They prefer dark places, as in caves or under fallen leaves, and have a very limited distributional range (Ihara, 1995).

At present forty nine species of *Arcuphantes* have been described. Among these, seven species were described from North America and forty two from Palaearctic region, Japan (33), Korea (6), China (2) and Mongolia (1) (Paik, 1974, 1978, 1983, 1985; Paik and Seo, 1984; Seo and Sohn, 1997; Platnick, 2006).

In this paper, the author described two new species of *Arcuphantes*, *A. juwangensis* from Mt. Juwangsan, Gyeongsangbuk-do and *A. namhaensis* from Mt. Geumsan, Namhae-gun, Gyeongsangnam-do. All eight Korean *Arcuphantes* have a convoluted epigynal scape with a wing-shaped structure at the distal end and show close similarities in the morphological characters.

Terms and abbreviations used in this paper are as follow: c, carapace length; d, p, r, and v in spination, dorsal, prolateral, retrolateral and ventral; Fem. I, length of femur I; Index, (width/length)  $\times$  100; Leg I, length of leg I; Met. I, length of metatarsus I; Pat. I, length of patella I; Tib. I, length of tibia I; Tm, position of trichobothrium of metatarsus. The

materials used in this study are deposited in the collection of Department of Biology, Keimyung University.

### SYSTEMATIC ACCOUNTS

Family Linyphiidae Blackwall, 1859

Genus *Arcuphantes* Chamberlin and Ivie, 1943

<sup>1</sup>\**Arcuphantes juwangensis* n. sp. (Fig. 1)

*Material examined.* Holotype: Female, Mt. Juwangsan (Gyeongsangbuk-do), 12 Nov. 2005 (C. W. Lee).

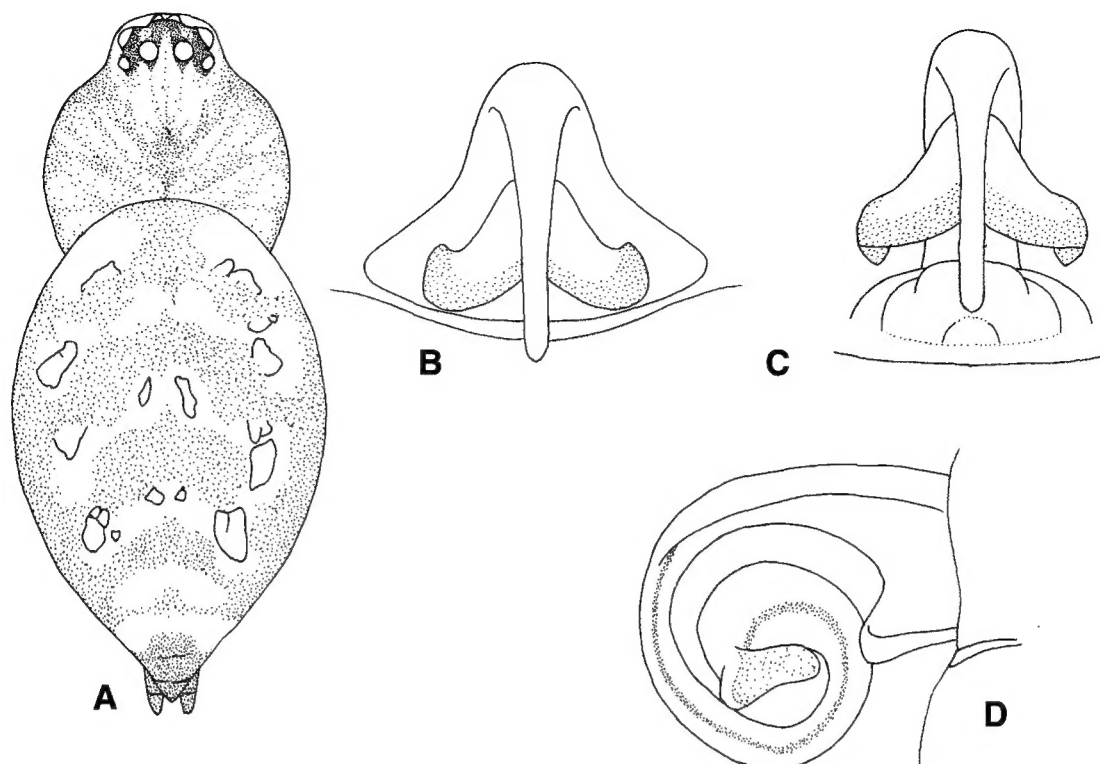
*Description.* Female (holotype): Carapace dark brown, with dark margin and radiating striae; median furrow short straight line, with slight posterior depression; cervical groove distinct; longer than wide, the index is 83. Cephalic width index is 66. Clypeus height 3 times of diameter of anterior median eye. Both eye rows recurved in dorsal view. Anterior eye row shorter than posterior eye row, the index is 91. Eye area index 80. Eye ratio, anterior lateral eye > posterior lateral eye = posterior median eye > anterior median eye (5.5 : 4 : 3). Anterior median eyes their radius apart, and about 0.7 times of their diameter from laterals. Posterior eyes separated equidistantly by about 0.6 times of their diameter. Lateral eyes of both rows contiguous. Median ocular quadrangle, posterior side > height > anterior side (11 : 10 : 7).

Chelicerae yellowish brown; armed with three large stout promarginal and five small retromarginal teeth. Sternum and labium dark brown. Palpi dark brown. Legs yellowish, with dark brown rings; all femora have a broad and a narrow band distally, and all tibiae have three bands. Leg formula 1243. Leg formula index, 100 : 87 : 51 : 84. Tm I 0.

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**Fig. 1.** *Arcuphantes juwangensis* n. sp. A, female, dorsal view; B, epigynum, ventral view; C, ditto, posterior view; D, ditto, lateral view. Scale bars=0.39 mm (A), 0.12 mm (B-D).

19. Tm II 0.19. Tm III 0.18. Metatarsus IV without a trichobothrium. Leg I/c 5.86. Fem. I/c 1.60. Fem. I/l/d 9.29. Tib. I/c 1.53. Tib. I/l/d 13.78. Met I/c 1.41. Met. I/tar. I 1.44. Met. IV/tar. IV 1.56. Pat. I+Tib. I/c 1.88. Leg spination as follows: femora I p0-1, v0-0- (1); tibiae I d1-1, p0-0-1, r0-1, v0-1-0; II d1-1, r0-1; III and IV d1-1; metatarsi I-III d1-0.

Abdomen oval, pointed posteriorly and dark brown (Fig. 1A); dorsum has six light chevron markings with white flecks longitudinally; venter has two pairs of light markings with white flecks below epigastric furrow. Abdomen index 61. Epigynum yellowish brown, with a convoluted scape; distal end of the convolution with a wing-shaped structure (Fig. 1B-D).

**Measurements** (mm). Female (holotype): body length 1.96; carapace length 0.81, width 0.67; abdomen length 1.44, width 0.88; cephalic width 0.44; sternum length 0.54, width 0.49; labium length 0.09, width 0.16; anterior eye row 0.32; posterior eye row 0.35.

Leg I 4.75 (1.30, 0.28, 1.24, 1.14, 0.79), II 4.11 (1.12, 0.26, 1.03, 1.00, 0.70), III 2.43 (0.74, 0.19, 0.51, 0.53, 0.46), IV 3.99 (1.17, 0.23, 0.98, 0.98, 0.63). Palp 1.05 (0.32, 0.12,

0.19, 0.42).

**Etymology.** The specific name is from the type locality, Mt. Juwangsan.

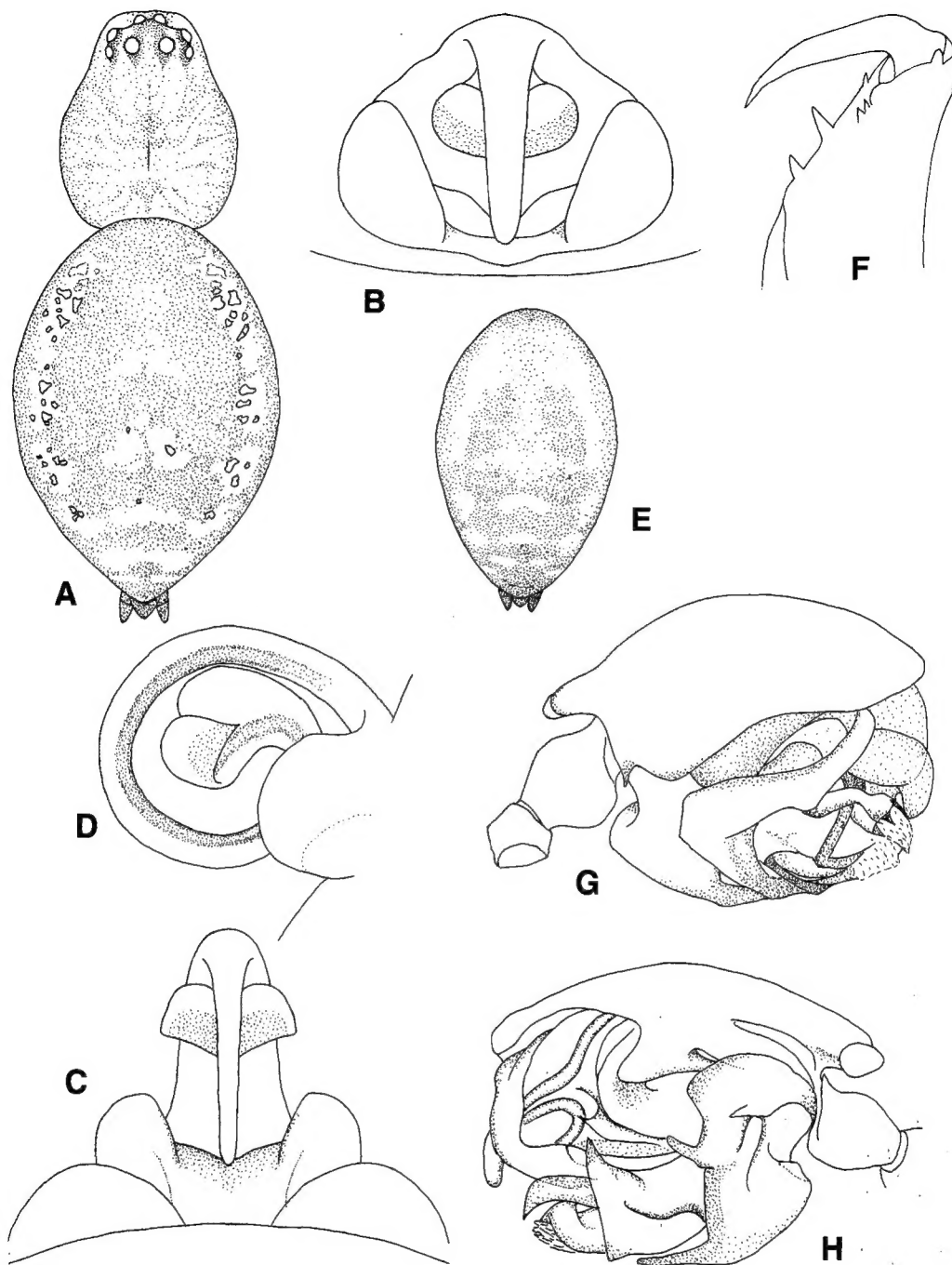
**Remarks.** Two known species of this genus, *Arcuphantes pennatus* Paik, 1983 and *Arcuphantes uhmi* Seo and Sohn, 1997, and new species, *A. juwangensis*, are much alike in the shape of the convoluted scape of epigynum, but clearly distinctive from each other in the structure of proximal protuberances, the distal wing-shape, leg formulae index, and Tm I value.

#### <sup>1</sup>*Arcuphantes namhaensis* n. sp. (Fig. 2)

**Material examined.** Holotype: Female, Mt. Geumsan, (Namhae-gun, Gyeongsangnam-do), 22 Jun. 2005 (J. Y. Kim). Paratype: 1 male, data same to holotype.

**Description.** Female (holotype): Carapace dark brown, with dark radiating striae; median furrow short straight line, with slight posterior depression; cervical groove distinct; longer than wide, the index 80. Cephalic width index 72. Clypeus height about 2.3 times of diameter of anterior median eyes. Both eye rows recurved in dorsal view. Anterior eye row

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**Fig. 2.** *Arcuphantes namhaensis* n. sp. A, female, dorsal view; B, epigynum, ventral view; C, ditto, posterior view; D, ditto, lateral view; E, male abdomen, dorsal view; F, left chelicera of male, inner view; G, left palp of male, prolateral view; H, ditto, retrolateral view. Scale bars=0.35 mm (A, E), 0.08 mm (B-D), 0.18 mm (F-H).

shorter than posterior one, the index 93. Eye area index 68. Eye ratio, anterior lateral eye=posterior lateral eye=posterior median eye>anterior median eye (5 : 4.5). Anterior median eyes a third of their diameter apart, and two thirds of their diameter from laterals. Posterior eyes separat-

ed equidistantly by about 0.6 times of their diameter. Lateral eyes of both rows contiguous. Median ocular quadrangle, posterior side>height>anterior side (13 : 11 : 10).

Chelicerae reddish brown; armed with three large stout promarginal and four small retromarginal teeth. Sternum

and labium dark brown. Palpi reddish brown. Leg reddish-brown, with dark brown bands; all femora have a narrow distal band, and tibiae I-III with narrow bands at both ends. Leg formula index, 100 : 90 : 67 : -. Tm I 0.22. Tm II 0.21. Tm III 0.21. Metatarsus IV absent. Leg I/c 5.59. Fem. I/c 1.50. Fem. I l/d 8.68. Tib. I/c 1.44. Tib. I l/d 13.17. Met I/c 1.40. Met. I/tar. I 1.50. Pat. I + Tib. I/c 1.75. Leg spination as follows: femora I p0-1-0, v1-0-0-0; II v1-1-1-0-0-0-1; III v1-1-1-0; IV v1-0-0-0; tibiae I d1-1, p0-1-0, r0-0-1, v0-1-1-0; II d1-1, p0-1-0, r0-1; III d1-1; metatarsi I-III d1-0-0. Abdomen oval, pointed posteriorly and dark brown (Fig. 2A); dorsum has four small light chevrons along longitudinal median line, and light patches with white flecks along margins; venter with a pair of white flecks.

Abdomen index 66. Epigynum dark brown; a convoluted scape with a wing-shaped structure distally (Fig. 2B-D).

*Male* (paratype): Color and general appearance similar to female. Carapace index 84. Cephalic width index 70. Clypeus height about 2.7 times of diameter of anterior median eyes. Eye row index 95. Eye area index 64. Eye ratio, anterior lateral eye = posterior median eye > posterior lateral eye = anterior median eye (5 : 4.5). Anterior median eyes a fifth of their diameter apart, and about 0.8 times of their diameter from laterals. Posterior eyes separated equidistantly by about 0.6 times of their diameter. Median ocular quadrangle, posterior side = height > anterior side (13 : 8).

Chelicerae yellowish-brown; armed with two large, one small promarginal and two small retromarginal teeth (Fig. 2F). Sternum and labium dark brown. Leg yellowish-brown, without dark brown band. Leg formula index, 100 : 88:66 :-. Tm I 0.23. Tm II 0.21. Tm III 0.22. Metatarsus IV absent. Leg I/c 5.95. Fem. I/c 1.51. Fem. I l/d 9.56. Tib. I/c 1.57. Tib. I l/d 16.27. Met I/c 1.60. Met. I/tar. I 1.63. Pat. I + Tib. I/c 1.86. Leg spination as follows: femora I p0-1-0; tibiae I d1-1, p1-0, r1-0; II d1-1, r1-0; III d1-1; metatarsi I-II d(1)-0-0; III d1-0-0.

Abdomen oval, dark brown (Fig. 2E); index 46. Palpal organ (Fig. 2G, H); cymbium with a round tip apophysis; chitinated paracymbium with a hook-shaped tip.

*Measurements* (mm). Female (holotype)/male (paratype): Body length 2.91/2.49; carapace length 1.10/1.14, width 0.88/0.96; abdomen length 1.86/1.72, width 1.23/0.79; cephalic width 0.63/0.67; sternum length 0.67/0.59, width 0.65/0.68; labium length 0.14/0.14, width 0.22/0.20; anterior eye row 0.40/0.41; posterior eye row 0.43/0.43.

Leg I 6.15/6.78 (1.65/1.72, 0.35/0.33, 1.58/1.79, 1.54/1.82, 1.03/1.12), II 5.55/5.98 (1.51/1.58, 0.33/0.32, 1.40/1.52, 1.40/1.58, 0.91/0.98), III 4.14/4.46 (1.16/1.23, 0.28/0.28, 0.98/1.09, 1.02/1.16, 0.70/0.70), IV -/- (1.52/1.65, 0.30/0.28, -/-, -/-, -/-). Palp 1.42/1.30 (0.42/0.49, 0.16/0.14, 0.28/0.14, 0.56/0.53).

*Etymology*. The specific name is from the type locality, Namhae.

*Remarks*. *A. namhaensis* n. sp. has a convoluted epigynal scape but easily distinguished from the others in the structures of proximal protuberances and the distal wing-shape, the paracymbium with a hook-shaped tip, and the male cheliceral teeth.

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Received March 10, 2006  
Accepted April 13, 2006